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MANOMETRIC CICATRIX OF THE MEMBRANA TYMPANI.

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IN a paper published in the Transactions of the American Otological Society for 1875, a case of movable cicatrix of the membrana tympani was reported; the character of the movements of the cicatrix, the conditions under which these movements occurred, and the results of the tests to which these conditions were subjected, proving conclusively varying degrees of intra-tympanic pressure during natural respiration and during phonation, which could be explained only by assuming a persistent patency of the Eustachian tube.

A second case, presenting substantially the same symptoms, and affording an opportunity for the repetition of the previous experiments, having fortunately come under recent observation, is made the subject of this paper.

The patient, a girl eighteen years of age, had suffered from purulent inflammation of the right middle ear in childhood. The inflammation and otorrhœa finally subsided, leaving a considerable diminution of hearing, and the following condition of the middle ear: The external auditory canal was normal, the membrana tympani exhibited a large perforation, fully two-thirds of the membrane having been destroyed. This perforation included principally the anterior and inferior segments. The remaining portion of the membrana tympani was much thickened, opaque, and showed two or three small spots of calcareous deposit. The malleus was drawn inward by the retraction of the musculus tensor tympani, the end of the manubrium being in contact with the inner tympanic wall. From the anterior edge of the perforation a cicatrix extended inward to the inner tympanic wall, and also upward and downward; extending, therefore, across the opening of the Eustachian tube, and completely separating the anterior from the posterior portion of the tympanic cavity. This cicatrix was consequently in the position best fitted to enable it to respond



to any pressure exerted upon its inner surface through the Eustachian tube, a condition almost precisely similar to that occurring in the case previously reported. The patient complained of a disagreeable sensation in the right ear, of about one week's duration, and following a severe head cold, during which it had been necessary to blow the nose forcibly and frequently. This sensation occurred with each expiration and inspiration, and on coughing or blowing the nose, and was described as a feeling of movement in the ear. It was also noticeable, but very slightly, and on attention being called to it, on the sounding of *m*, *n*, and *ng*. Examination showed during expiration a movement of the cicatrix outward, with a corresponding movement inward during inspiration. This movement was much more decided when the patient breathed through the nose, and less marked on breathing through the mouth. Valsalvian inflation forced the cicatrix outward, its centre being nearly on a level with the anterior edge of the perforation of the membrana tympani.

During phonation the movements of the cicatrix corresponded to those observed in the previous case, and to the logographic curves of the consonant sounds, as nearly as this could be determined by measuring the extent and duration of the excursions of the cicatrix.

With the *m*, *n*, and *ng* sounds, either pronounced separately or following in the course of conversation, the movements were most decided, and the excursions of the cicatrix were increased in extent by closing the nostrils while speaking. A repetition of the experiments made in the first case, and an observation of the movements of the cicatrix, showed the pressure in the naso-pharyngeal space, and consequently the intratympanic pressure, to be greater during the sounding of vowels followed by the consonant checks, and as a rule, less when the consonant preceded the vowel sound. With *m*, *n*, and *ng*, as has been stated, the movement was greatest; and with the pure vowel sounds little or no movement was perceptible.

The patient was fortunately willing to endure the sensations in the ear for the sake of experiment, and after a repetition of the tests on succeeding days, the cicatrix was punctured, with relief from the disagreeable symptoms, which have not returned during a period of three months.

The occurrence of these sensations in the ear on breathing and during phonation, at so late a day, and so long after the probable completion of the cicatricial growth, may be explained on the supposition that an originally tense cicatrix had become gradually stretched and extended inward, by the forcible infla-

tion of the Eustachian tube during successive head colds, the result being, in both of these cases, the furnishing of a delicate manometric membrane, so circumstanced, both as to its position and its laxity, as to respond readily to very slight pressure. The delicacy of this natural manometer was readily shown, by comparing its movements with those of a column of fluid in a Politzer manometer inserted in the ear after puncture of the membrane; the pronunciation of the softer consonant sounds causing a movement of the cicatrix which could not be detected in a fluid column one mm. in diameter and two cm. in height.

OTOLOGICAL REVIEW.

By CLARENCE J. BLAKE, OF BOSTON.

1. C. BÖTERS. Ueber Necrose des Gehör-Labyrinths. Inaugural-Dissertation. Halle, 1875.
2. A. LUCÉ. Ueber Ausstossung der nekrotischen Schnecke mit Bemerkungen über den relativen Werth der üblichen Methode der Hörprüfung. *Arch. für Ohrenheilkunde*, B. 13. IV.—4.
3. DAROLLES. Otite aiguë moyenne, paralysie faciale et méningite aiguë par irruption du pus dans l'aqueduc de Fallope. *Bullet. de la Société Anat. de Paris*. 1875. 1.
4. M. E. TOURNERET. Infection purulente suite d'otite interne. *Gaz. Méd. de Strasbourg*. 1875. 2.
5. R. VOLTOLINI. Die acute Zellenhautentzündung in der Supra-und Postauricular-Gegend. *Monatschr. für Ohrenheilkunde*. Dec., 1875.
6. F. OYSTON. Memorandum of the Presence of Air in the Middle Ear as a sign of Live Birth. *Br. and Foreign Med. Chirurg. Review*. Oct., 1875.
7. J. LUYB. Contributions à l'étude des lésions intra-cérébrales de la surdi-mutité. *Annales des Maladies de l'Oreille et du Larynx*. 1. 5.
8. CHARCOT. Guérison de la maladie de Ménière par le sulfate de quinine. *Gaz. des Hop.*, 1875. 95-98.
9. B. HAGEN. Subcutane Injectionen von Strychninum nitricum gegen nervöse Schwerhörigkeit und Innervationsstörungen der Binnenmuskeln des Mittel-Ohrs. *Centralbl. f. Med. Wissenschaften*. 1875. 36.
10. J. J. ITARD. L'électrothérapie appliquée aux bourdonnements d'oreille et à la surdité nerveuse. *Thèse de Paris*, 1875.
11. V. VAJDA. Syphilitische Infection der Tuba Eustachii. *Bericht der Klinik für Syphilis des K. K. Allgemeinen Krankenhauses*. Wien, 1875.

1. JACOBY, in his review of Dr. Böters' paper, says with justice that among the numerous otological inaugural dissertations which have from time to time proceeded from the medical school of Halle, this is especially worthy of notice. The author gives a very comprehensive review of the literature of the subject, and draws his conclusions from these and from his own observations with commendable clearness. The introduction, which directs attention to the fact that in consequence of anatomical stric-

ture necrosis can occur only, with exception of the external auditory canal, in the osseous labyrinth, enumerates chronologically, with commentary notes, the cases of necrosis of the labyrinth, accompanied by descriptions of the osseous preparations, which have been recorded since the first paper of Wilde in 1855. In all the sixteen cases given, with exception of that reported by Dr. Canells (Glasgow), there was absolute deafness, and in seven of these also facial paralysis.

This table is followed by a discussion concerning the relatively rare occurrence of necrosis as compared with caries, and of the influence which age, sex, and general constitutional condition may have in this connection.

As immediate cause of the pathological process in the osseous structures of the labyrinth there existed in all the cases, with the exception of that of Wilde, a purulent inflammation of the mucous lining of the tympanic cavity, with periostitis of the petrous portion of the temporal bone, of several years' duration. In support of the occurrence of necrosis of the labyrinth as a more or less isolated affection, the author cites the notes of v. Trötsch in this connection, namely, the early and complete ossification of the labyrinth, its nourishment by means of especial non-anastomosing vessels, and finally, its extraordinary solidity of structure. The frequent coincidence of facial paralysis with necrosis of the labyrinth, occurring in seven of the sixteen cases, the author refers to the topographical relations of the outer and superior semicircular canals and cochlea to the Fallopian canal, which would render a necrotic separation of any of these structures without injury to the canal and the facial nerve out of the question—an opinion which is fully supported by the pathological observations in cases given.

As an explanation of the existence of a necrosis of the labyrinth without implication of the surrounding spongy bone, the author presents two possibilities, namely, embolism of the internal auditory artery, which probably existed in the case of Wilde, where the necrosis was not preceded by a purulent inflammation of the middle ear, and purulent periostitis of the labyrinth as a result of chronic purulent inflammation of the middle ear, the means of communication being afforded by destruction of the membrana tympani secundaria; numerous *post-mortems* in such cases showing the course of the disease, which terminated fatally before complete necrosis of the labyrinth occurred.

A further proof of the correctness of this assumption is found in the presence of polypi accompanying the chronic purulent inflammation of the middle ear in the majority of the cases, with the consequent retention of the foul secretions and increased pressure. In this connection the author

directs attention to the comparative immunity from the pathological process possessed by the semicircular canals, and finds in the comparatively frequent implication of the cochlea alone an evidence of the correctness of the assumption that the fenestra rotunda serves as the channel for communication of the purulent periostitis to the labyrinth, for did this occur by means of a fistulous opening into the semicircular canals or through the fenestra ovalis, observations would not be wanting of separation of the semicircular canals alone. As symptoms of the rupture of the membrana tympani secundaria and the extension of the purulent periostitis, the most characteristic are the sudden occurrence of loud, subjective noises, deep-seated pain, vertigo, nausea, and vomiting. Following the enumeration of symptoms, the author gives notes as to the duration of the disease in the several cases mentioned, from the first implication of the labyrinth to the time of its separation—in some cases until removal of the necrosed cochlea. The thesis concludes with a review of the prognosis and treatment of this comparatively rare complication of middle-ear disease.

2. In connection with the above thesis a case recently reported by Prof. Lucae is of especial interest. The patient, a strong, healthy man, dated his affection of the right ear from the year 1866, when, during artillery practice, following the discharge of a field piece, he noticed a sharp pain in the ear followed by a slight hemorrhage; with exception of deafness he had no further symptoms of trouble for several years, until, in October, 1874, there appeared a purulent, sanguineous discharge from the ear accompanied by a chronic headache confined to the right side of the head, and frequent vertigo, which finally led him to seek relief at the hands of the author in May, 1875. At this time the whole of the right auricular region, both in front of the tragus and over the mastoid process, was slightly tender on pressure and percussion; no swelling, however, was visible. The external auditory canal was swollen and filled with offensive pus, removal of which revealed deep-seated granulations. The left ear being tightly stopped, words whispered close to the right ear were distinctly heard. Ordered syringing with salicylic acid (1 : 600). Four days later canal and anterior auricular region swollen; wet compresses were applied for seven days, with diminution of the pain, tenderness, and swelling; at this time pressure upon the mastoid region gave little or no pain, and an examination following thorough syringing of the ear revealed in the cartilaginous portion of the external auditory canal a hard body of a dirty, grayish color and about the size of a pea. This was removed with the forceps, and proved to be the upper two-thirds of the necrosed cochlea. A repetition of the tests for hearing gave the following results: The left ear being tightly stopped,

whispered words were heard, as on the occasion of the first examination; but on the right ear also being closed, the whisper was heard with equal distinctness. The same result was given by tests with König's rods.

The tests of conduction of sound through the bones of the head are especially noteworthy. The large tuning-forks C', C, and contra-A, applied to the apex and on the forehead, were heard only in the left, the unaffected ear, but applied to the occiput equally well in both ears. The large C fork being applied to the right mastoid, the patient was uncertain as to whether the sound was heard only on the right or also on the left. The butt of the fork being placed in the right meatus, the patient merely felt the vibration without hearing the tone.

Nine days later the meatus was but slightly swollen anteriorly and superiorly, the granulations and discharge had nearly disappeared, the opening in the anterior portion of the membrana tympani was plainly visible, the headache and vertigo had entirely disappeared, and the patient passed from observation. Four months later his condition remained the same, and there had been no recurrence of the otorrhœa.

This case is interesting from the original cause of the trouble and the later occurrence of the more serious disease, the comparative immunity of the patient from the graver symptoms which might have been expected, and the progress of the ultimate necrosis to so favorable a result. It demands further consideration also from the results of the tests with regard to the hearing, upon which Prof. Lucæ lays particular stress. The apparent perceptive power remaining to the affected ear is in itself a sufficient commentary upon the necessity for careful tests in comparative cases, the degree of sound conductivity, not only of the ear itself, under pathological conditions, but also of the circumjacent parts, being an open question.

3. The case reported by Darolles is a sufficient commentary upon itself, and may be quoted as presenting the course of the disease without surgical interference. A woman thirty-eight years of age, having caught a severe cold after an attack of acute rheumatism, had severe pain and almost total deafness of the right ear. Three days later she complained of a sensation as if the drumhead had been ruptured, and with the appearance of a purulent discharge the pain diminished; the deafness, however, persisted. Two days later, recurrence of cephalalgia, the purulent discharge diminished, and there was tenderness on pressure over the mastoid. On the tenth day from the commencement of the inflammation complete facial paralysis on the right side, and from this time forward marked fever and obstinate constipation. On the thirteenth day contraction of the muscles of the neck, pulse 130, temp. 40.8°. On the fifteenth day, opisthotonus,

herpetic eruption of the face—on the right side about the lips and angle of the eye, and on the left side in the centre of the cheek. On the sixteenth day, profuse perspiration, involuntary evacuations, and paralysis of the left arm; pupils dilated, and reacting slowly; thready pulse, and a temperature of 40.6° . In the evening the patient died. The section showed injection of the veins of the pia and dura mater, extensive purulent infiltration of the subarachnoid cellular tissue, especially at the base, and also on the convexity of the right hemisphere; on the left side only that portion of the brain over the sphenoid. Small, insulated collections of pus were also apparent along the course of the blood-vessels on the convexity of the brain; in several places the pia mater was adherent to the gray substance. The outer surface of the petrous portion of the temporal bone was intact, the tympanum filled with pus, in which the ossicula floated free. In the superior portion of the membrana tympani was a small perforation; the mastoid cells were also filled with pus, and the facial nerve, laid bare to the point at which in the hiatus Fallopii it makes its second turn, was covered with thick pus; the remaining walls of the tympanic cavity were intact.

4. The following case may be added to that above quoted :

A female teacher, forty-three years of age, never very robust, and having scrofulous scars on the neck, was attacked, after taking cold, with severe intermittent pains in the right side of the head. These symptoms were followed by perforation of the membrana tympani and purulent otorrhœa, and later still by cessation of the purulent discharge, marked chills, and constipation. Three weeks later the cephalalgia diminished coincidentally with the occurrence of severe pain in the left hypochondrium and decided fever, the pupils became dilated, the conjunctiva assumed a yellowish tinge, the tongue became heavily coated, the pulse dicrotic, the temperature rose to 40.2° , and delirium set in. The abdomen became tender, there were marked icterus and involuntary evacuations, the pulse could be barely felt, the temperature suddenly fell to 36° , and the patient died four weeks from the commencement of the attack. The section gave : hyperæmia of the dura mater, especially on the right side; pseudo-membranous deposits on the arachnoid; the substance of the brain and the ventricles intact; the outer surface of the temporal bone showed no signs of caries, but no thorough examination was made. The spleen was swollen and softened, with *metastatic abscesses*; the kidneys hyperæmic, and in the right kidney two *metastatic abscesses*. There was also fresh peritonitis, and numerous submucous ecchymoses in the intestine.

5. Voltolini directs attention to a form of mastoid periostitis as yet

undescribed by otological authorities. Slight mention of independent periostitis of the mastoid is made by Wilde, and also by Gruber,* and it has been the fortune of the reviewer to have observed one case in which the acute periostitis of the outer surface of the mastoid was hardly referable to any extensive inflammatory process from the meatus or middle ear. The ætiology of the ordinary mastoid periostitis has been so carefully studied and so richly illustrated during the past few years, that the first question which occurs to the reader of this paper is concerning the possible origin of an inflammation of so severe a character, independent of any previous inflammation of either the outer or middle ear. Voltolini considers the disease described as much peculiar to the mastoid region as is the othaematoma peculiar to the auricle, and as regards its ætiology, remarks that he has observed such cases in Silesia only, although, as is well known, he has had control of ample otological material previously in the far north, in Pomerania and in Berlin. The disease appears to result from atmospheric causes, that is, from exposure to cold; at least, this was the explanation given by several of the patients. The region implicated also is that portion of the post-auricular surface free from hair and particularly exposed, and what is further characteristic, not only one side but the corresponding region behind both ears was sometimes similarly affected.

The ear itself remains intact, but may sometimes in the course of the disease participate in the inflammation. The disease begins with severe tearing pains on one or both sides of the head, which extend to the side of the face and teeth. The pain is sometimes referred to carious teeth by the patient, but later, fever sets in, and the pain becomes localized about the posterior auricular region, the mastoid surface becomes swollen, smooth, red, tense, and exceedingly tender. If active antiphlogistic treatment does not relieve these symptoms, the case progresses to suppuration, under which circumstance the best remedy is, as always, the knife. The same rule with regard to the early use of the knife holds good in these cases, as in those where the superficial periostitis follows an acute inflammation of the middle ear. The following cases may be cited in illustration: A shepherd, forty years of age, was attacked after exposure with severe pain, swelling, redness, and tenderness above and behind the right ear; the application of eight leeches did not diminish these symptoms, and on the following day a long and deep incision was made over the mastoid. The pain was almost immediately relieved, the patient slept well, and made a good and speedy recovery.

* Oster. Zeitschr. für Prakt. Heilkunde, 1863.

A woman, forty years of age, after exposure in the open air with the head uncovered, had severe pain in the left side of the head, which finally became confined to the region of the mastoid. The hearing being somewhat diminished, the patient was at first treated by the family physician for a supposed disease of the ear. The author, being called in consultation, found the following condition : The region behind and above the ear was swollen, red, and tender ; with exception of a slight swelling on the superior posterior wall of the external auditory canal, the outer ear was normal. The membrana tympani, although there was some diminution of hearing, presented no specially abnormal appearance, nor was there any evidence of more deeply seated trouble. Three days later, after application of poultices, an incision was made above and behind the ear, with liberation of considerable foul pus, and a relief from the pain, which continued to the termination of the case in recovery. The third case given did not end so fortunately.

A gardener, fifty-six years of age, in the winter of 1874, rode a mile into the country in an open wagon, a cold wind and snow blowing upon the back of his head. On the following day he was attacked with severe pain affecting the whole head and teeth. This pain continued with varying intensity, but always severe, for several weeks, and finally became localized behind both ears. The mastoid region became swollen, and the proposal for an incision, made by the physician called in attendance, being refused by the patient, the inflammation took its course. The application of poultices finally induced a spontaneous opening and discharge, with some relief from the pain, which still continued in a measure. Nine months after the first attack the patient was seen accidentally by the author, who found the following condition : The hearing was but slightly diminished, as the patient could easily hear conversation in the ordinary tone. The region behind and above both ears was much swollen and relaxed, pus discharged from the left ear having found its way through the posterior wall of the meatus. Fistulous openings in the neck led upward to the original seat of the inflammatory process, the pus having burrowed on both sides for a distance of from two to three inches before finding escape.

Free incisions, opening up the channels through which the pus had burrowed, were made, but a careful examination failed to detect any implication of the bone ; this treatment, followed by poultices, seemed of good effect, and the patient improved with nourishing food and rest. On the third day fever set in, with increased weakness, erysipelatous inflammation attacked the edges of the cuts, and then extended over the scalp, and, on the ninth day after the operation, the patient died.

A study of these cases shows that the disease is neither one of the auricle, the external auditory canal, the tympanic cavity, nor the mastoid cells; that it originates without, and not within the ear, and that it may progress inward, but would hardly penetrate deeply. As has been before said, the rule with regard to incision holds good here, as in those cases where the inflammation follows the periosteum along the posterior wall of the auditory canal, the original seat of the disease existing in the middle ear.

The case observed by the reviewer as presenting somewhat similar symptoms, was that of a young woman, twenty-six years of age, recovering with great prostration from typhoid fever. Earlier in the disease there had been purulent inflammation of both middle ears, with large perforation of the *membrana tympani* of both ears. This disease was rapidly diminishing, and the purulent discharge had gradually decreased. Severe headache, lasting several days, was followed by localization of the pain behind and above the left ear. There was no accompanying change in the quantity or character of the otorrhœa, such as would have accompanied an extension of the inflammation to the mastoid cells; the constitutional symptoms, notably the premonitory increase in temperature, were also wanting, and there was neither redness, tenderness, nor swelling of the external auditory canal. The tenderness over the mastoid region, also, was general, as in external mastoid periotitis, and not localized, as in inflammation of the mastoid cells. The case was remarked particularly at the time for the peculiarity of its symptoms; and, considering the general condition of the convalescent, and the liability to superficial abscesses in such cases of debility, the diagnosis of independent periostitis of the mastoid region was given. The treatment consisted in the application of poultices, and a free incision, liberating about an ounce of pus, with relief from the pain, and recovery in two weeks. During this time, the disease of the middle ear remained unchanged, and is now following its usual course toward recovery.

6. In a paper published in the *Monatschrift für Ohrenheilkunde*, in 1868, and in subsequent papers, some of which have appeared quite recently, Wreden has directed the attention of medical jurists to the entrance of air into the middle ear, and the disappearance of the gelatinous substance which fills the tympanic cavity prior and up to the birth of the child. These communications, in which the author claims for this test an equality to, if not an advantage over the ordinary test, by examination of the lungs, have called forth considerable testimony in rebuttal, and among the papers published both in Germany and England is an interest-

ing table given by Ogston. Wreden states that the gelatinous substance mentioned disappears within twenty-four hours after birth ; that twelve hours' respiration is not sufficient to effect its complete disappearance ; and he therefore suggests that the occurrence of the presence of air in this situation might be of importance in a medico-legal point of view, as proving that respiration had taken place. Ogston, on the other hand, considers that these statements have been made without sufficient grounds, and that they require considerable modification. In support of this opinion he submits the following table of fifteen cases :

	AGE.	STATE OF MIDDLE EARS.	STATE OF LUNGS.	CAUSE OF DEATH.	OTHER FACTS TO FIX TERM OF LIFE.
1	14 weeks.	Filled with air.	Fully expanded.	Smothering.	Bronchitis.
2	9 weeks.	Filled with air.	Fully expanded.	Smothering.	Bronchitis.
3	2 months.	Filled with fluid.	Fully expanded.	Smothering.	
4	6 weeks.	R. air. L. muddy fluid.	Fully expanded.	Smothering.	Bronchitis.
5	1 month.	Filled with air.	Fully expanded.	Smothering.	
6	4 weeks.	R. air. L. air and fluid.	Fully expanded.	Broncho-pneumonia.	
7	8 days.	Filled with air.	Fully expanded.	Bronchitis.	Lungs bulky, emphysematous.
8	3 days.	Containing air.	Fully expanded.	Smothering.	
9	2 hours.	Fluid and yellow substance.	Partly expanded.	Apoplexia neonatorum.	Breathed feebly two hours.
10	New-born.	Containing fluid.	Expanded.	Smothering.	Meconium in large intestine.
11	New-born.	Filled with red fluid.	Expanded.	Fracture skull.	Meconium in large intestine.
12	New-born.	Containing fluid.	Expanded.	Smothering.	Navel string attached.
13	New-born.	Containing red fluid.	Partly expanded.	Query.	Navel string attached.
14	New-born.	Containing air.	Expanded.	Smothering.	Navel string attached.
15	New-born.	Containing fluid.	Unexpanded.	Still-born.	

The first six cases might have been omitted from the table in this connection. The last nine, says Prof. Ogston, are those in which Wreden's proposed test would be supposed to be useful, but in only three (6, 7, 14) was air found in the middle ears, although the lungs in all, with exception of a still-born, immature infant, contained sufficient air to float in water, and from all air could be expressed when held under water.

7. Luys gives the results of careful *post-mortem* examinations in two cases of deaf-mutism of long standing, and finds in his microscopic sec-

tions ground for the opinion which his paper sets forth, that the intracerebral point for the transformation of the sensation of sound lies in the posterior portions of the thalami optici, while the ultimate point of perception is to be found in the posterior region of the cortical substance. In both of the cases examined the posterior portion of the thalamus opticus was of a grayish color, softened, with serous infiltration resembling a colloid substance, and exhibiting a large number of amyloid bodies. The gray substance in the neighborhood of the aqueductus Sylvii was changed in the same manner. The continuations of the nervi acustici in the fourth ventricle were visible in the form of indistinct, greyish, œdematus fibrils.

8. Charcot, having observed, in several cases, that the attacks which occur during the progress of Ménière's disease were preceded by a loud whistling subjective noise, and that, like the aura epileptica, this was the premonitory symptom of the vertigo, loss of co-ordination of motion, nausea, and vomiting which quickly followed, was led to attempt the substitution of a similar physiological symptom by means of quinine, thereby aborting the subsequent attack. In several cases which, according to Revillout, presented the group of symptoms characteristic of the so-called Ménière's disease, Charcot gave from 0.75 to 1.20 grm. sulphate of quinine daily continuously for several weeks. The subjective sound resulting from the quinine was kept up for several weeks at a time, and the remedy was omitted occasionally only, in case of disturbance of digestion, and then resumed. In a majority of the cases a decided improvement was effected, and in some, so far as the attacks mentioned were concerned, complete relief followed. Whether that marked symptom of the disease, the deafness, was also relieved, the paper does not state. In a later number of the same journal Dr. Barcot gives the results of the administration of quinine in similar cases, with equally good effect.

9. Hagen reports the results of his use for the past nine months of subcutaneous injections of strychnine in cases of nervous deafness. He finds this treatment of unquestionable value and of permanent effect. An aqueous solution of one per cent. is used every third day, and injected under the skin, covering the mastoid process. In the cases in question, little or no other treatment was employed. The injections of strychnine seemed to have no effect whatever upon the subjective symptoms.

10. Following a description of the various forms of apparatus for the application of electricity and for testing its effects upon the human system, J. J. Itard takes up the question of tinnitus aurium, and divides this affection, according to its causes, into five different classes :

1. Tinnitus due to the presence of a foreign body in the external auditory canal or Eustachian tube.

2. Tinnitus due to inflammation of some one of the divisions of the organ of hearing.

3. Tinnitus of vascular origin.

4. Tinnitus of nervous origin.

5. Tinnitus occurring without appreciable pathological change, and the origin of which is questionable.

The results, as given, of his observations on the use of the galvanic current, the rheophores being applied over both mastoid processes, may be summed as follows :

1. The currents modify and localize the tinnitus.

2. Certain subjective sounds resist the action of the current longer than others ; this is especially the case with a whistling sound.

3. The tinnitus diminishes in intensity with the diminution of the deafness, and disappears with the restoration of hearing.

4. The use of the galvanic current is sufficient to cure deafness of nervous origin ; if this result is not obtained, at least, the hearing is always improved.

5. A shorter period is necessary for treatment if the deafness is of recent origin.

6. A degree of relief is experienced immediately after the application of the current.

7. Only feeble, continued currents should be used.

8. It is important not to fatigue the patient by too prolonged or too painful an application.

9. The more simple operative procedures give the best results.

The breadth of the conclusions as above given lays them open to criticism on that account, and as regards the third statement, that the subjective noises become more feeble as the deafness diminishes. The reviewer's experience has been that in a large number of cases the negative pole being applied to the affected ear, the tinnitus increased with a progressive improvement in hearing, and then diminished, sometimes quite rapidly, the improvement in hearing continuing.

11. Dr. Vajda reports an interesting case of syphilitic infection which, his conclusions being correct, carries its own moral. A servant girl, twenty-seven years of age, appeared at the clinic with extensive papules of the mucous membrane of the mouth, and especially of the soft palate, tonsils, and posterior pharyngeal wall. On careful examination with the rhinoscope the mouth of the left Eustachian tube was seen closed and

surrounded by firm infiltration, the surface being opaque, white, and irregular ; the cervical lymphatic glands were extensively inflamed. The patient was very deaf, and considered her present trouble due to the repeated use of the catheter six months previously for relief from a former deafness. The hymen was intact, and there was no sign of specific lesion. Ten days later inunction with oleate of mercury was commenced. After thirteen applications and touching of the mouth with nitrate of silver, the local symptoms diminished. The condition of the throat and mouth improved and the hearing increased. The further treatment consisted in simple cleansing of the mouth and throat, and nineteen days later the patient was discharged.

